DOCUMENT RESUME

ED 437 568 CE 079 657

AUTHOR	Hughes, Katherine L.; Moore, David Thornton; Bailey, Thomas R.
TITLE	Work-Based Learning and Academic Skills. IEE Working Paper No. 15.
INSTITUTION	Columbia Univ., New York, NY. Inst. on Education and the Economy.
SPONS AGENCY	Pew Charitable Trusts, Philadelphia, PA.; DeWitt Wallace/Reader's Digest Fund, Pleasantville, NY.
REPORT NO	IEE-WP-15
PUB DATE	1999-09-00
NOTE	53p.
AVAILABLE FROM	Institute on Education and the Economy, Teachers College, Columbia University, Box 174, 439 Thorndike Hall, 525 W. 120th St., New York, NY 10027 ($7). For full text: http://www.tc.collumbia.edu/~iee/Public.htm.
PUB TYPE	Reports - Evaluative (142)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	*Academic Education; *Allied Health Occupations Education; Community Colleges; *Education Work Relationship; High Schools; Hospitals; Internship Programs; Literature Reviews; Outcomes of Education; Productivity; Reinforcement; Skill Development; Student Employment; *Transfer of Training; Two Year Colleges; *Vocational Education; *Work Experience Programs

ABSTRACT

The claim that work-based experience improves students' academic performance was examined through a study of the academic progress of 25 high school and community college student interns employed in various health care workplaces. Data were collected from the following activities: (1) review of the literature on academic reinforcement and academic outcomes of school-to-work programs; (2) site visits to interview faculty, staff, students, and employers; (3) observation of classroom-based links to the work-based learning components. In 9 of the 25 cases examined, no evidence for any of the following claims for academic reinforcement were found: school-based knowledge is applied; school-based knowledge is explored and tested; and motivation toward school is positively affected. Twelve students experienced instances of simple application of school-based knowledge at work. Evidence of the testing and exploration of school-based knowledge was found in only three cases. Except for those students who were taking courses in clerical skills and data entry in school, the academic reinforcement functions of work experience were minimal. Overall, the interns' work was functional to the employing organization but hardly academic. (Contains 47 references. Appended is a student essay question on productivity in a hospital setting and a sample student response.) (MN)

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Institute on Education and the Economy

Work-Based Learning and Academic Skills

Katherine L. Hughes
David Thornton Moore
Thomas R. Bailey

IEE Working Paper No. 15
September 1999

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The research and this paper were supported with funding from The Pew Charitable Trusts and the DeWitt Wallace – Readers Digest Fund. The authors thank Lea C. William and Briana Cons for research assistance and are grateful to the educators and students who participated in the study.

ABSTRACT

Educators who support work-based learning as a program for secondary school students make a number of different claims for its utility. One such claim is that work-based experience will improve students' academic performance. To investigate this argument, we review existing studies of how work affects youths' academic performance, and studies of the academic achievement of students in programs that include work-based learning. We then present empirical data from our research on five such programs, as well as draw on the observations of others who have studied student interns. We conclude that the evidence does not provide strong support for this popular assertion about work-based learning, but there are other, non-academic but equally important forms of learning that can come from work experience and that these forms give us good grounds for supporting work-based learning.

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INTRODUCTION

Educators who support work-based learning as a program for secondary school students make a number of different claims for its utility. Urquiola and his colleagues (1997) identify five primary purposes for work-based learning: 1) acquiring knowledge or skill related to employment in particular occupations or industries; 2) providing career exploration and planning; 3) learning all aspects of an industry; 4) increasing personal and social competence related to work in general; and 5) enhancing students' motivation and academic achievement. A growing body of research is supporting the contentions that through work-based learning youth can acquire occupational and social skills, as well as information about industries and possible careers (c.f. Hollenbeck, 1996b; Hamilton & Hamilton, 1997; Stasz & Brewer, 1998; Hershey, Silverberg, Haimson, Hudis, & Jackson, 1999).

This paper investigates the claim that work-based experience will improve students' academic performance. The 1994 School-to-Work Opportunities Act aimed to make work-based learning a significant part of the education of America's youth. The Office of Technology Assessment (OTA), in a congressionally-mandated study of the legislation, suggests that one of the rationales for the act is as follows: "Academic work and occupational preparation in schools are to be upgraded and the two are to be integrated so that students can see how academics will be applicable in their work lives. Work-based learning experiences are to extend the academic and occupational instruction of schools..." (OTA, 1995, p. 3). Yet interestingly, the legislation does not explicitly make the academic reinforcement claim. The act is more vague, stating that "students in the United States can achieve high academic and occupational standards, and many learn

better and retain more when the students learn in context, rather than in the abstract" (Section 2). The legislation goes on to say that work-based learning, combined with school-based learning, "can be very effective in engaging student interest, enhancing skill acquisition …" and the list continues. Yet academic skills are not specifically named (Section 3).

It is likely that the academic reinforcement claim came about as a response to opposition towards the spread of school-to-work programs. Originally, these programs were targeted towards the "forgotten half"—the middle half of high school students who exhibit no serious problems but are likely not headed for college (or at least four-year colleges) (Bailey & Merritt, 1997). As the school-to-work strategy came to be seen by some as having broader potential—and when the legislation referred specifically to "all students"—opponents began to argue that work-based learning activities undermine academic learning. Opponents associate the initiative with vocational education, with the resulting view that school-to-work is "a threat to the college-prep curriculum" (Urquiola et al., 1997, p. 99; see also Vo, 1997). Higher academic standards and new academic tests are being implemented at the same time that school-to-work programs have been proliferating. Asserting that work-based learning contributes to, rather than takes away from, academic achievement is an apt rejoinder to critics. So the academic reinforcement claim has become ubiquitous.

Among work-based learning practitioners the relationship between classroom learning and workplace learning tends to be generally assumed. That is, internship coordinators and cooperative education directors often use rhetoric that suggests that students can apply academic knowledge in workplace activities, and that learning in the

workplace somehow reinforces school-based knowledge. As an example, the School District of Philadelphia (1998) distributes a handout to workplace mentors offering a rationale for the learning plan that they prepare for students; "within the context of the work site," the paper maintains, "students gain insight into how specific career-related jobs operate, which skills are most essential, and *how what is learned in school integrates with the real world*" (italics added). Since that claim seems to underlie much of the pedagogical practice and social policy in the field, it is important to subject it to more rigorous scrutiny.

Below, we test the common propositions about academic reinforcement. We first review some existing literature, including studies of how work affects youths' academic performance, and studies of the academic achievement of students in programs that include work-based learning. We then draw on empirical data from an investigation of five such programs. In addition, we draw on the work of Stasz and her associates (Stasz & Brewer, 1998; Stasz & Kaganoff, 1997), and the earlier work of Moore (1981a; 1981b; 1986), all of whom also observed student interns. This body of data provides a great deal of detailed description of what actually happens when students engage in work-based educational programs.

METHODOLOGY

This investigation is the third part of a multi-year research project on work-based learning, in which we first examined employer participation in work-based learning programs and then pedagogy for on-the-job learning.[i] Hence the initial research sites were selected on the basis of their strong work-based learning components and solid employer involvement. For the present part of the project, we chose to continue work at

three of our sites where there were efforts to connect work-based learning with classroom-based learning. In addition, we chose two new sites on the basis of program staff's assertions that academics were a high priority in the programs, and that academics were integrated with the work experiences. Thus we believed these programs showed promise for academic reinforcement.

Visits were made to the programs to interview faculty, staff, students, and employers, and to observe any classroom-based links to the work-based learning components. In the case of one academy program that followed a set written curriculum for the school-based classes, we undertook a detailed study of all the coursework. For the other programs, we collected and studied a variety of syllabi and lesson plans. At each program, between four and eight student interns were chosen as subjects.[11] The students were observed several times (for several hours each time) over the course of their internships, as well as interviewed before and after their work placements. The observations were written up according to Schatzman and Strauss's (1973) method for recording and ordering field research data. The interviews touched on many themes: the students' expectations for their internships, what they thought they were learning, whether what they learned would be useful in school or in future work experiences, their plans after high school, and so on. In total, data were collected from observations and interviews of 25 student interns. The students were placed in a variety of workplaces, ranging from small non-profit organizations to large Fortune 500 companies, and they worked in many different fields, for example health, business and administration, education, the arts, and construction.

THE REINFORCEMENT CLAIM

James Herndon's story in *How to Survive in Your Native Land* (1971), about his student who could keep score flawlessly in the bowling league but who flunked every math test (even when Herndon gave him bowling-score math problems), demonstrates the serious disjuncture between classroom operations and real-world operations. The extensive literature by researchers like Scribner (1986) and Sternberg (1986) on the concept of practical intelligence, as well as the studies of real-world math by Lave (1988) and others, suggest that people rarely perform the kinds of cognitive operations outside of classrooms that they perform inside them. Cole, Hood and McDermott's (1978) influential critique of experimental cognitive psychology argues that people don't think the same way in real-world situations as they do in laboratories. This is one of the core insights of the field of situated cognition: Cognitive activity varies across social contexts.

It may be at least intuitively obvious to say that people in workplaces *do* read, write, and compute. But it is also fair to ask whether the way they do those things corresponds broadly to what they do in classrooms. The situated and distributed cognition theorists suggest that it does not. There are some fundamental differences, they argue, between computation, writing, problem-solving, and memory in the classroom and in the workplace. Resnick's oft-cited article *Learning In School and Out* enumerates the broad differences between school learning and other learning: individual cognition in school versus shared cognition outside; pure mentation in school versus tool manipulation outside; symbol manipulation in school versus contextualized reasoning outside school; and generalized learning in school versus situation-specific competencies outside. Her point is that schooling is not organized so as to transmit the skills and

abilities required for performance outside of school, and increasingly it is even failing at imparting academic competencies; she says, "Modifying schooling to better enable it to promote skills for learning outside school may simultaneously renew its academic value" (p. 18). Resnick's contentions have been used in support of work-based learning programs; however, she does not directly advocate work-based learning but rather a transformation of the classroom "to redirect the focus of schooling to encompass more of the features of successful out-of-school functioning" (p. 19).

Thus there is now a body of research that demonstrates not the connection between, but the separation between classroom knowledge and that outside the classroom. Berryman and Bailey (1992) point out that "research, spanning decades, shows that individuals do not predictably transfer knowledge ... They do not predictably transfer school knowledge to everyday practice. They do not predictably transfer sound everyday practice to school endeavors, even when the former seems clearly relevant to the latter" (p. 46). Raizen (1989) also reviewed the literature and came to the conclusion that "research has documented the fact that people learn differently on the job and through experience than they do in formal school settings and, just as important, that they use what they know differently" (p. 23).

If school and work are so different, and individuals do not transfer knowledge gained from one to the other, it follows that in order to be fully prepared, young people should have both. It does not directly ensue that learning out of school will improve learning in school. Yet the reinforcement thesis makes three kinds of implicit assumptions about how academic knowledge and workplace experience may connect. First, school-based knowledge may be applied in work settings, and thus reinforced. The

student may, for instance, use reading skills learned in school to comprehend instruction manuals, or she may apply arithmetic skills to accounting tasks. This process, we infer, yields a form of practice that solidifies school knowledge. In the terms of Bloom's (1956) well-known taxonomy, reinforcement may thus be achieved through work activities calling for knowledge and application.

Second, school-based knowledge might be explored and tested: The learner can think through the meaning, validity and utility of school-derived knowledge in a practical setting. This process goes beyond mere application to enlarge the student's understanding and cognitive skills by requiring additional forms of thinking, such as comprehension, analysis, synthesis and evaluation. The claim is that doing something in the work world with school-derived knowledge makes the student grasp the knowledge in more elaborate, profound ways. Here is where the notion of situated learning applies to work-based learning: If, as Brown and his colleagues (1989) argue, people learn more effectively when they use knowledge in a meaningful social context, then surely an actual workplace is one such environment.

For example, a student in an accounting office who has learned in class a particular technique for double-entry bookkeeping may have to determine whether the school version works successfully in solving situation-specific problems. She may have to consider several elements of the process (analysis) and assess them in relation to such workplace criteria as time demands and customer needs to make that decision (evaluation). Finally, she may need to draw on both classroom-based methods and local practices to construct a strategy tailored to the specific requirements of her work (synthesis).

Third, work-based learning may have motivational effects. During an internship, a student may recognize that academic knowledge actually has meaning in the world, thus providing an incentive to study. Students may also learn the schooling requirements for different careers, for example, if one wants to become a doctor, one had better start hitting the science and math books. In an evaluation of a group of travel and tourism academies, 69 percent of the seniors said that the summer internship "motivated me to continue my education" (Academy for Educational Development, 1995). In addition, for students who are not successful at the traditional in-school curriculum and as a result lack confidence about their abilities, capably completing an internship may encourage them academically. Bailey and Merritt (1997) quote the director of a career academy as saying, "Many of my students come to me at-risk and leave college-bound," and point out that "this type of change in goals and aspirations of the student is the most obvious case in which school-to-work promotes academic learning..." (p. 22).

DEFINING ACADEMIC KNOWLEDGE AND SKILLS

In order to judge the reinforcement claim, one must first address a definitional question: what one means by *academic knowledge and skills*. Stasz and Brewer's (1998a) recent paper on academic skills at work points out the debatable nature of the term "academic skill." Academic skills have commonly been viewed as "measurable properties of individuals," referring to academic achievement tests, although the situative perspective has argued that knowledge and skills cannot be understood outside of the context in which they're applied (Stasz & Brewer, 1998, pp. 7-8). Others refer to reading and math skills as "basic skills" that "must be learned as a foundation for all other learning" (Raizen, 1989, p. 19).

Thus it is appropriate for researchers to ask, what do work-based learning proponents mean when they refer to academic skills? What kinds of academic knowledge do students acquire in the classroom that might then be (or not be) reinforced in the workplace? How would we know these academic forms of knowledge if we saw them in the work world?

Work-based learning proponents seem to take a fairly straight-forward, unproblematic perspective on that question: Students learn to add, subtract, divide and multiply; they learn to read with comprehension and write grammatically; they learn to solve certain kinds of problems (e.g., algebra equations, chemistry formulas) and to recall certain kinds of information (e.g., names of authors, dates of events). That is, they learn to use the skills of computation, expression, memory and problem-solving that school-based tests look for. It would be reasonable, then, to ask whether those same classroom skills are demanded by the work-based tasks that student-interns undertake.

The reinforcement argument also seems to imply that student-interns can apply higher-level theory and analytic skills. A student in an urban community center, for instance, might have occasion to connect his observations of poverty in the neighborhood with academic ideas about social class and economic development. A student in a medical lab might use school-derived concepts about anatomy and physiology in the course of an experiment. An accounting student might execute certain bookkeeping functions by means of classroom-learned procedures.

Once we establish the terms of our examination, we need to pursue the more empirical question of whether students actually have occasion to apply school-based knowledge, however defined, in a clear-cut, systematic and explicit way. Do they in fact

get the right kind of and enough practice in the use of such knowledge? Further, do they ever explore the school knowledge in a process that leads them explicitly to think through its implications or its adequacy? Are they held accountable for the competent display of this knowledge? If and to the extent that these processes occur, we might reasonably claim that workplace experience reinforces school-based learning—deepens it, strengthens it, enlarges it.

The results of one study imply that it might be difficult to link academic skills used at work with academics taught in the classroom. Stasz and Brewer (1998a) analyzed technical jobs (that required at least a high school diploma but less than a bachelor's degree) at four different firms to determine which academic skills were evident in the jobs and whether they were central to the work or only used occasionally. The researchers also tried to obtain a sense of the relationship of academic knowledge and skill to work practice in general. These researchers found that academic skills, particularly math and science, were essential to these jobs, but the skills varied according to the job, the community of practice, and the work setting. The level of academic skill used also varied. Most significant was that the academic skills were in a sense "hidden" in the work activity, as "the language that workers use to discuss academic skill does not necessarily correspond with the topics of subject areas defined in the school curricula" (p. 93). The authors conclude that because mathematics and science knowledge varies with work context, academics on the job have a "situated nature" (p. 94).

Finally, there is a curriculum design issue embedded in the reinforcement claim. Even when the knowledge connections between classroom and workplace are clear, as they may sometimes be, the organization of that information in the students' experience

might or might not be educationally effective. The basic premise of the school curriculum, rooted in works by Ralph Tyler (1949), Jerome Bruner (1966; 1977) and others, is that exposure to the knowledge of a discipline must be structured in such a way as to build a student's understanding incrementally from the simple and foundational through the complex and advanced. We start teaching chemistry with fundamental information about elements, for instance, and then move on to more difficult ideas resting on that foundation. That sort of incremental exposure to disciplined knowledge does not often appear in naturally-occurring work situations, even in research laboratories. Rather, workers are assumed to have that foundational knowledge, and to perform their tasks by drawing on it. The sequence in which they need certain kinds of knowledge stems from the production process in the workplace, and does not typically coincide with the sequence in which they originally learned it in school.

Of course, there are modern educators, often descended from Dewey (cf. 1938), who believed that the first step in acquiring complex academic knowledge (biology, for instance, or even history) should be *doing* the discipline rather than *studying* it; one should be introduced to biology by participating in what biologists do, rather than by first building up a tool-kit of fundamental concepts and theories. That approach has great strengths—and may constitute a strong argument for work-based learning—but it raises the pedagogical question of whether it suffices for the purposes of education. In looking at the relationship between school-based and work-based learning, that is, we need to ask not only about the *content* of the learning but about the *structure* of the student's engagement with it. A student working in a highly sophisticated environment—say, as

an assistant in a medical research laboratory (cf. Stasz & Kaganoff, 1997)—may or may not participate in the full range of knowledge-use that her biology teacher desires.

EXISTING DATA

There is some existing literature that is germane to this topic. In this section we first briefly look at studies of the effects of part-time work on students' academic performance. Part-time jobs that students find themselves are not entirely comparable to school-organized work-based learning placements, and indeed the national evaluation of school-to-work implementation finds that students rate school placements higher in learning opportunities than the jobs they find on their own (Hershey et al., 1999). Still, this area of research may be instructive. We then thoroughly review the new and growing body of literature that addresses the academic achievement of students in work-based learning programs.

Academic Achievement and Working while in School

For some time, researchers have been interested in the effects of working on student behaviors and schoolwork. National data show that the vast majority of American high school students work (cf. National Center for Education Statistics, 1998). Many people are concerned that working for pay while in school diminishes academic performance. Greenberger and Steinberg (1986) contend that work affects student outcomes negatively. Mortimer and Johnson (1986), in an analysis of a longitudinal sample of young males, found that those who did not work at all during high school had higher grade point averages (GPAs) in their senior year, and higher educational and

occupational aspirations. The authors did not find a strong process of selection that might have accounted for these results.

Another study found a negative association between academic achievement and hours spent in part-time work. Stasz and Brewer (1998a) analyzed longitudinal data on youth from two national databases, looking at the relationships between working while in school, academic outcomes, and participation in extracurricular activities. The common paths they found were the following: students tended to have either high academic achievement and high participation in extracurricular activities, or low academic achievement and a great deal of part-time work experience (no causality can be inferred). Schoenhals, Tienda, and Schneider (1998) also analyzed longitudinal data, controlling for background characteristics that differed between students who did, and did not, work. They found no negative effects of employment on grades, nor did youth employment lower the amount of time students spent reading or on homework.

In a recent review of the literature on adolescence and work, Mortimer and Johnson (1997) conclude that, under certain conditions, working can have positive effects on academic attainment. Working part-time or less does not appear to have deleterious effects on GPA, and in some cases seems to affect GPA positively. Stern and Briggs (1999), also in reviewing the literature, contend that "the association between hours of work and performance in school follows an inverted-U pattern, with students who work moderate hours performing at a higher level than students who work more, or not at all" (p. 3). Thus the number of hours youth work may be the salient variable in determining whether working has negative or positive effects (or none at all).

In sum, there is as yet no simple or conclusive answer to the question of whether working while in high school has positive or negative consequences for students' academic achievement. As Schoenhals, Tienda, and Schneider (1998) note, there is "an astonishing lack of consensus" (p. 724), which is partly due to methodological disputes.

Participation in School-to-Work Programs and Academic Outcomes

The research on the academic achievement of students in programs that include work-based learning is fairly new and insubstantial and the results so far are mixed. Some studies find no effect, or negative effects. For example, Hamilton and Hamilton (1997), in their study of 100 students participating in the Cornell Youth Apprenticeship Demonstration Project, found that the youths did gain job-related skills and knowledge, but there were no effects on their academic achievement. The authors conclude that improved academic achievement will have to be a central goal of such programs before effects will be seen. Similarly, Stasz and Brewer (1998) found from a survey of students in two different work-based learning programs that while overall the students rated their work-based learning experiences positively, they primarily learned work-readiness-related attitudes and behaviors, and they perceived links between the internships and the classroom to be weak.

The 1996 High Schools That Work Assessment found that those students who were earning credit for part-time jobs connected with school had lower achievement in reading, mathematics, and science than students with part-time jobs that were not related to a school program (Bottoms & Presson, n.d.). (When dividing the sample by sex, however, the differences hold only for males.) The authors explain these results by noting that students whose jobs were connected with school worked longer hours than the

other working students. Fewer of the former type of students took mathematics and science courses during their senior year, as they were instead enrolled in unchallenging vocational courses. It appears that for some students, school-related employment is substituting for higher-level courses, with the result of lower academic achievement.

Other research has yielded more positive findings. A comparison of students enrolled in the Flint, Michigan Manufacturing Technology Partnership (MTP) program with a group of similar students not enrolled in the program found that the MTP students had higher grade point averages and higher average class ranks, as well as fewer absences (Hollenbeck, 1996a). In addition, for the first cohort of students, participation in the program did not diminish the number of math or science courses taken. However, students in the second cohort of the program did take more vocational education courses, rather than math and science courses, relative to the comparison group students. Another study focused on a sample of black students from four Philadelphia high schools (Linnehan, n.d.). This study found that participation in work-based learning for more than half the academic year had positive effects on the students' GPAs, compared with students who participated for a shorter period of time or students who were eligible for work placements but did not end up participating.

A study based on observations of student interns from three different programs found significant learning opportunities at the worksites (Stasz & Kaganoff, 1997). In a transportation academy, school learning appeared to enhance work, and in both a medical program and a school-based enterprise, work appeared to enhance school learning. A more in-depth study of the transportation program compared student outcomes with the outcomes of students from magnet schools and from the general school population. This

study found that, for grade point average, credits earned, on-time credit acquisition, and attendance, transportation academy students performed better than students in the general population, and comparably to magnet school students who are screened before being admitted (Hanser & Stasz, 1999). However, this study did not entirely account for selection effects. In addition, while internships are a part of the transportation academy program, it is unclear if all the students included in the study had participated in work-based learning. In fact, since half the sample consisted of students from grades nine and ten, it is likely that at least that half had not yet had work placements. Thus one cannot necessarily attribute any positive academic outcomes to the work-based learning portion of the program.

This is a problem common to other studies of student outcomes. The 1995-6 evaluation of 42 California Partnership Academies enrolling over 5000 students found that over students' four-year tenure in the academies, students improved their attendance and grade point averages (Foothill Associates, 1997). Yet again, while internships are one element of the academy program, it is unclear whether all students participate in work-based learning. The report states that some academies have a community service component while others offer internships, some of which are paid. And, the researchers found that the largest gain in performance occurred early in the four-year program, between the ninth and tenth grades. Again, it is likely that these students had not yet engaged in work-based learning. Thus while student outcomes are positive, they can most likely be attributed to components of the academy program other than work-based learning. Another study compared career academy students with students in the general, academic, and vocational tracks at public schools in the same district, and found that

while the career academies enrolled more at-risk students than the other tracks, the students were as likely to attend college as students in the academic track (Maxwell & Rubin, 1997). In this instance it is impossible to determine whether that outcome has anything to do with work-based learning; the report does not specify how many of the students studied participated in it.

The interim evaluation report of the New York State School-to-Work system states that "students who actively participated in STW programs and activities demonstrated better academic performance than comparable students with little or no STW exposure" (Westchester Institute for Human Services Research, 1997, p. 33). These findings come from an analysis of transcripts and surveys of randomly selected high school seniors from seven school-to-work partnerships in the state. However, the report also notes that less than 15 percent of high school seniors have participated in structured work-based learning experiences, and "work-based learning generally does not involve a school-based component that extends or complements the knowledge and information gained at the worksite" (p. 27). Once again, we cannot use these findings as evidence that work-based learning improves academic performance.

In sum, the research in this area has mixed results so far. It seems that participation in a work-based learning program can improve academic achievement, but in some cases the positive effects aren't attributable to the work-based learning component itself. Stasz and Kaganoff (1997) raise the possibility that any positive outcomes of programs may be due to their characteristically small size and personal focus. We might expect results to be better for programs that make concerted efforts to integrate work-based learning with academics; yet a lack of information makes it

impossible to compare the programs studied above on that basis. Thus the quantitative evidence is as yet inconclusive. In the next section, we turn from quantitative data to our own and others' qualitative data on students' work-based learning experiences.

TESTING THE CLAIM

To test the claim that work-based learning can have positive effects on academic learning, we contend that one must be able to see its origins in the details of students' workplace experiences, in the texture of their participation in specific situated activities. This requirement escapes the danger of the facile assumptions about the relationship between academic learning and work experience captured in statements like these: "She worked in a hospital, so she must have applied her knowledge from biology class," or "He had to compose business letters, so his writing skills must have improved." These claims may or may not be true—it depends on the particulars of the students' experience. Thus to substantiate the claim, we would need to find several things in the data on students' experiences:

- Student-interns using forms of knowledge—content (facts, theories), skills (reading, writing, quantitative reasoning), and higher-order thinking (problem-solving, hypothesis testing, analysis of cause-effect relations, etc.)—that are substantively analogous to the forms of knowledge acquired and used in school;
- Interns engaging these forms of knowledge often enough to strengthen them by means of practice;
- Interns having opportunities to explore, elaborate and test these forms of knowledge in the context of situated activities, where they can recognize the meaning and utility of school knowledge and its connection to situated knowledge-use;

- The engagement of the interns with this knowledge organized in such a way that they encounter a substantial range of the knowledge used in school, rather than just fragments of it.

This is not to argue that the work-based learning needs to mirror or duplicate the school-based learning, but only that, if the academic reinforcement thesis is to be confirmed, students should be found actively engaging the school-like knowledge in the course of participating in work activity. Otherwise, the claim will be seen as merely rhetorical.

We analyzed data from our observations and interviews with 25 student interns, to look for evidence of engagement in school-like knowledge at students' internships. We looked for students' engagement in content knowledge, as well as students' use of reading, writing, math, and science skills. We also looked for examples of work-based learning positively affecting motivation towards schoolwork. (See Table 1 for the results of the analysis.) Below, we give examples from our fieldwork, as well as examples, as appropriate, from the work of Moore (1981a; 1981b; 1986), and Stasz and her associates (Stasz & Brewer, 1998; Stasz & Kaganoff, 1997).

Content Knowledge

We will look first at the data on content knowledge, asking whether interns engage facts and theories that they might first encounter in school. Among other things, students in high schools acquire (take in, store and retrieve) certain kinds of information and ideas: that the Erie Canal was opened in 1825; that economic struggles between the industrializing North and the agricultural South were among the causes of the Civil War; that falling objects accelerate at 14 feet per second per second. One empirical question

for proponents of work-based learning, then, is whether students encounter this kind of knowledge in their internships. Sometimes, according to our studies, they do:

- An SEL student working at a local history museum, as part of her training as a tour guide for elementary school classes, learned the names of colonial governors and mayors; the dates of key events in English settlement; the dominant forms of transportation in the early nineteenth century, and so on. (Moore, 1986)
- An IEE subject working as a nurse's assistant in a hospital had a conversation with a physician in which he heard facts about the liver and its disorders. (IEE case viiic)
- An IEE subject working for a travel industry magazine learned about the different countries featured in different issues of the magazine. (IEE case xvii)

More often, though, it is difficult to locate content-knowledge in the workplace that corresponds in any clear way with the content-knowledge encountered in the classroom. What the tour-guide may remember a year after the internship is not the name of the last Dutch governor of New York so much as how to deliver a lecture and how to manage the behavior of a group of third-graders. Matthew, the hospital aide, got only a single, fragmentary lesson on the liver, but he did learn how to make beds with people in them, how to demonstrate care and sensitivity in interactions with sick people, and when to ask questions. What Sinda, the young woman at the travel magazine, will remember most is that, when the magazine featured a map of Africa and spelled Zimbabwe wrong, the company re-printed the issue with the corrected spelling; "You can't mess up," she

said in amazement, understanding that errors in the real world have consequences. These are not items of knowledge that would typically appear in a course syllabus or lesson plan.

Skill-Oriented Knowledge-Use: Reading, Writing, Math, and Science

What about more skill-oriented knowledge-use? One might expect to find that form of school-related learning more easily in the workplace. Again, however, our data tend to contradict that expectation. In our fieldwork, we did not often find students performing school-like tasks, or even tasks that implicitly drew on knowledge obviously derived from school. Even *reading* was not a significant part of their experience. To be sure, some (not all) did occasionally read at work: instruction manuals, organizational brochures and reports, and so on. Our best guess is that the grade level of those reading materials rarely exceeded 8th or 9th grade. Their reading was highly episodic, not sustained. Its function was usually to provide specific information that the student needed to perform a work task, or perhaps to construct a bit of background knowledge (about the overall structure of the organization, for instance). Understanding these materials was not difficult; they were fairly straightforward, declarative, informational. Interns did not need to interpret or analyze long texts. Moreover, we rarely saw students being held accountable for things they had read; rather, they were held accountable for performing the tasks for which they were doing background reading. Thus, in terms of reading skills, one could conclude that work-based experience did not provide much in the way of reinforcement: There was not much practice and virtually no testing.

One student in particular, Nell, was asked if her reading disability had caused any problems in her internship. She asserted that the lack of reading at her work placement was a positive thing:

> …there really isn't any reading. They just show you hands-on what to do. Which I like anyway. I learn best that way… (IEE case viiia)

In a rare case, Maureen, who was interning as a middle-school teacher's aide, was given reading assignments by her supervisor, a music teacher:

> I do a lot of reading for him and the way I show him my knowledge is the way I am able to apply that knowledge in the class. Like I'm able to teach a certain way, and he can say, 'Oh, isn't that a Kane and Kane way? You got that part, didn't you? Oh, isn't that Howard Gardner?' (IEE case xiiidt2, p. 8)

Through college-level outside reading, this student was exposed to different learning theories which she could then apply to her work as a teacher's aide. While this is an admirable instance of a student's connecting academic theory and real-world application, it was unclear whether this knowledge was connected back to her in-school classes. The school programs did sometimes inject work-related reading into the students' assignments. For instance, a young man working at a veterinary hospital said students in his English class could choose books to read and study according to their interest and/or internship. Fred picked *All Creatures Great and Small*, about a veterinarian.

> He said this book was more on the social aspect of being a vet, as opposed to the technical aspect. He found this interesting because he said he needs to work on the social aspect a bit. Occasionally he is annoyed by clients who complain about having to pay vet bills ... He thinks he should be more understanding of these clients. He tried to tie this book into some of his journal entries. This worked out OK, as opposed to previous books they were assigned to read (IEE observation xiiia2).

But the fact remains that the IEE observers rarely saw students doing sustained, complex reading. Even the school-generated reading assignments were only tangential to the work itself.

Moore's research through the School for External Learning and Stasz's work in Los Angeles included sites where interns did do substantial reading: the history museum in the SEL case, for example, or the medical research lab in Stasz's. To prepare for giving tours related to state history, the SEL student not only watched a veteran guide lead elementary-school classes around the galleries, but she spent a good deal of time in the Education Department library reading appropriate sources on such topics as colonial government and transportation (Moore, 1986). Similarly, the Los Angeles students in the medical careers program, who functioned as lab assistants, were sometimes assigned to go to the hospital library to find research articles related to current work; moreover, their supervisor occasionally gave them background reading on the fundamental science involved in the experiments (Stasz & Kaganoff, 1997). In both instances, the reading was substantial, challenging and clearly related to work tasks. But it must be said that these examples were in the distinct minority—most student interns did not do much work-related reading.

Nor did most students in the three studies do much *writing* as they took part in work activities. Some positive examples show up in Moore's (1981b) SEL data: a reporter for a community newspaper; a legislative assistant for a city council member; even a cabinetmaker's apprentice who was required by the master to write commentaries on historical styles of furniture. In the present study, an intern in the legal department of a municipal agency was asked to digest the transcripts from cases (IEE Observation iiia6:65-74), producing memos for the attorneys. A student working with an independent film-maker wrote his own short script (IEE case xiiic). And the student working for the travel magazine did write an article for the magazine (IEE case xvii). But these students

were in the minority: Very few of the subjects in any of the studies did any sustained, significant writing.

Similarly, only a few of the students we observed engaged in substantial *mathematical* work, especially anything requiring complex operations and problem-solving. The young man working with the independent filmmaker had to create a budget for his film, and the young man working on the construction site said that he could see how geometry was used in carpentry. One student, Hiroshi, worked in the materials warehouse of an investment bank and used math in an inventory project:

> With a serious look on his face, he concentrated on counting numbers on a total report that consisted of product requests, and product transfer sheets. The number tally included: description, number of case quantity, quantity per case, number of cartons, and total quantity. In the beginning, he mentally figured the calculations. Later, he turned and got the calculator from a co-worker's desk for more complex calculations. He turned to the co-worker and asked her for some post-its; he put one on each pile of papers and wrote P, C, or Q on it; and then proceeded to count through all the reports. Someone came in and asked him "Are all these reports from today?" and he said that most of them were. (IEE fieldnotes, xi3, p. 3)

Another IEE subject, Catherine, worked in an investment bank's mutual funds department and performed significant computations for a task called "paying the brokers out":

> But what happened was, usually what happens is that the fund itself will send us a report that kind of lists all the trades for the month and the bottom line would be that okay, that the following brokers made this much money in terms of commission on these trades that they've done over the month. And they would just give us the figures and they would send us a check for that amount so that we could go back to our branches and give the money to the brokers. Now, this month, I guess it was June, something happened. The report was not done. We didn't have a report from the fund. So we had to go back to our records, do all the math. They have like a system for it… I was working with that for a while. I was just printing statements out. I had my pile, I would go back. I would find the average of things. I would add this, multiply by that. There are a lot of steps involved. It's not just like one thing. Everything needs to be averaged out over the month. And yes, there was the math part, the printing out part, the writing it

> out part, separating it by fund, separating by branches, separating by the individuals, all that good stuff. (IEE transcript, xiit2, p.15)

The best example is a community college student, Carmen, who worked as an assistant accountant in an advertising firm:

> The work performed by [this] office appears to be basic procedural accounting. The work consists of four main accounting functions: management of cash flow and reconciliation of bank accounts, paying vendor contracts and expenses, reimbursing [company] staff for travel and business expenses, and payroll ... On the day [the researcher] visited, Karen was engaged in a cash-flow management task ... [which] basically involved identifying which checks in a stack already printed for mailing should be withheld to adjust the amount of funds remaining in the firm's four bank accounts at the end of the month ... She added the withheld checks up to get a total and then went ... to enter the data into a Lotus spreadsheet used for monitoring cash flow (IEE Observation iva1).

Carmen' work came as close to *application* of school-based knowledge as anything we saw: She used bookkeeping techniques learned in class to handle the accounts. And she adapted those methods to her specific setting—that is, she *tested* her school learning, went beyond it to make it useful in her work. For instance, she had to check expense vouchers for "reasonableness," which required that she develop a sense of what kinds of expenses were appropriate by the company's standards; this chore took her beyond classroom techniques for tracking expenses. In that sense, her work experience may have reinforced her school learning. But her duties stayed on a fairly rudimentary level, not getting into more advanced accounting practices.

None of the other IEE subjects got real practice or testing experience in mathematics—and thus, by our reckoning, little reinforcement of school-based math knowledge. They did not even seem to engage in the kinds of everyday math that Lave (1988) describes among grocery shoppers or Scribner (1986) among dairy workers.

Some of the students in Stasz's study worked extensively with numbers. One medical lab intern tracked the statistical results of an experiment on rats' muscular

reflexes; while a computer program actually performed the necessary calculations, the student did have to understand what the study was about and how the results fit into that enterprise. In a school-based enterprise where students produced and marketed salad dressings, participants had to manage the books: keep track of expenses, sales revenues, profits and so on (Stasz & Kaganoff, 1997). Certainly those tasks had characteristics akin to school math, and therefore represented a form of academic reinforcement—although many of the students in the program were probably not taking accounting or business math, but were presumably learning these practices *in situ* rather than reinforcing classroom-derived knowledge.

Again, we have some evidence that the degree to which school-based knowledge appears in work settings varies a great deal from situation to situation. If the data from these studies are at all representative of high school students' work-based learning experiences, one could conclude that interns rarely have occasion to practice or explore mathematics skills in the workplace. It might be, of course, that even a small amount of exposure to math-like problems in the non-classroom world motivates students to work harder at math in school. We simply have no data to confirm that hunch. In any case, with a few notable exceptions, the observations do not yield much to support the idea that work-based learning can help students strengthen their quantitative reasoning.

A careful reading of the descriptions of internships in the three studies suggests that the reinforcement of *science* concepts and theories does occasionally happen, but more often is very difficult to find. Three of the students in the high school health program did come across school-based science knowledge in their hospital internships; Fiona is one example:

> One example I can think offhand is when I went to CAT lab, and I saw angioplasty being performed. And … when I went back into high school, we were studying the cardiovascular system and she talked about angioplasty … So I thought that was a good connection because when we were learning about it, if I just heard about it then or read about it in a book, I probably wouldn't have remembered it or understand it. But because I actually went to the CAT lab, actually saw it and they had the nurse sitting there and we were looking at the screen and watching it, and like I was standing there saying yeah, I see blockage here and stuff like that … (IEE transcript viiibt1, p. 29)

Fiona, while not able to do much hands-on work at the hospital, was assigned her own patient case studies, where she read patient charts, analyzed them, and then wrote up their cases, combining reading, comprehension, science, and writing knowledge and skills.

Fred, the veterinary assistant, observed operations and picked up some detailed knowledge of animal anatomy and physiology in the process. For instance, during the amputation of a cat's tail,

> ... [the doctor and another technician] placed the cat on the newly clean operating table and stuck a tube down its mouth. Then they discussed how much of its tail to shave, began shaving, and vacuumed up the hair. Then they began "expressing" the bladder, which Fred explained to [the researcher] ... While the doctor and technician were performing these tasks, Fred remained at the sink just on the other side of the operating room, but he could see into the room perfectly ... He told me in a matter-of-fact way what was going on at each moment ... Fred asked the doctor if the purpose of a cat's tail is to help the cat balance. The technician replied that probably balance is one purpose, but cats seem to do fine without them. Fred continued with his running commentary, saying, "She's sterilizing the area" as the technician rubbed some liquid all over the cat's tail and behind. The tech corrected him, saying the area would be "aseptic," not "sterile." Fred didn't mind the correction ... Fred asked, "How much of the tail is actually bone?" The doctor replied, "It's bone all the way down" (IEE Observation xiiia1).

At moments like this, the student was introduced (sometimes by observing the natural process of the work, sometimes by taking the initiative to ask questions, sometimes by playing a peripheral role in the activity) to interesting information that might also have been encountered in school. Theoretically, experiences such as these could help a student comprehend and retain classroom knowledge, and Fred claimed to

see a connection between his internship and the AP biology course he was taking, saying that in class they were learning the "underlying science" of some of the work that is done at the animal hospital. But Fred was doing poorly in the class, and he had trouble being very specific in explaining how his work in the veterinary hospital gave him an opportunity to apply and explore the knowledge he was acquiring in biology class. Since most of his work through the final observation involved fairly menial tasks—filing, cleaning up the operating area, etc.—it is not clear that he experienced these school-to-work connections on more than a rhetorical level. Thus, even in some cases where the reinforcement effect could be argued, data supporting it are shaky.

Matthew, from the high school health program, emphasized the differences, rather than the similarities, between his science education at school and that at the hospital:

> Oh, on my rotation I'm learning more about what would be done to fix a problem. While in the classroom I'm learning more about the parts of the body. Like learning about the heart. Like, specific things, like how it works. Where, like, if I were in cardiology or something, I would be learning about how they would fix it. Just more of the problems that go wrong. (IEE transcript viiict2, p.36)

Logically, one would need to know how something works before one can fix a problem, but this student saw these two fields of knowledge as separate, rather than connected.

The medical careers academy in Los Angeles gave students regular and systematic exposure to sophisticated scientific information and procedures; indeed, the level of science encountered by these students exceeded what they found in their high school classes. Stasz points out that the teaching hospital where the interns worked had educational practices deeply embedded in its culture; that function stands at the core of the institution's mission. She also notes, however, that staff were accustomed to teaching medical students, not high school students, and that they occasionally had difficulty

accommodating the latter's learning needs (Stasz & Kaganoff, 1997). Ironically, then, the students may or may not have been prepared for this level of science.

Motivation

A recent survey of over one thousand American teenagers was entitled *Getting By: What American Teenagers Really Think About Their Schools* (Johnson, Farkas, & Bers, 1997). The title reflects the study's findings: most students say they could do better in school if they tried, but they have minimal interest in academic subjects. Majorities of student respondents said that the best thing about school is that they get to be with their friends, and they do not think they will need to know in the real world the things their school is teaching. Yet, a majority of student respondents to the survey also said that doing a job internship for school credit would result in them learning "a lot more." Unfortunately, the survey question did not specify what area this learning might be in. Still, it is a rather enthusiastic response from an otherwise disengaged population.

The motivation claim of the academic reinforcement argument for work-based learning is the notion that, by encountering school-related knowledge in the meaningful contexts of work activity, students will develop a stronger incentive to study hard in school. Fred's earlier claim about seeing the "underlying science" from his AP biology class in his work at the animal hospital represents a class of possibilities. The problem is that we simply have too little data to test this proposition; in a qualitative study it is too difficult to trace the impact of specific experiences on attitudes about another enterprise. While Fred barely passed his AP biology class, one could argue that the internship helped him to pass and that he might have failed otherwise.

A few students did claim that they were doing better in school because, through their internship, they had become more interested in a particular topic or field. Nell, who had a reading disability, said that, although the program was harder and she was assigned more homework than the previous school year, her grades had improved. This was because she "cared more" because there was "more stuff that interested me" (IEE transcript viiiat2, p. 35). Matthew said he had "straightened out" "because now I know what I want to do and I know what I have to do to get there. And I like this program and it actually makes a lot of learning fun" (IEE transcript viiict1, p. 9). He agreed that the program was hard, but being interested in the topic made it easier. A student from the high school economics and finance program said too, "When I'm interested I study harder" (xit1, p. 8).

Thus, we do find some evidence for the motivation claim. Students may find certain occupations attractive (vet, CPA, surgeon), and may therefore be impelled to pursue certain kinds of study to attain those career positions. Students in "theme" programs may also find that classes using health or banking careers as a context are certainly more "fun" than classes in which the subject matter is entirely abstract. These effects are certainly worthwhile, but it is not the same thing as discovering direct relations between specific academic knowledge and particular work practices. And sometimes the experience of work in the real world has a different kind of motivational effect: two other students, Renee and Maria, had such tedious internships that they became highly motivated to attend college directly from high school, rather than delaying post-secondary enrollment or combining it with work.

Summary

In Table 1, we summarize the results of the analysis of our cases, noting for each student whether the three claims for academic reinforcement (school-based knowledge is applied, school-based knowledge is explored and tested, and motivation towards school is positively affected) were met. For nine of the students (over one-third of our sample), over the course of multiple visits to the internship sites, and before-and-after in-depth interviews with the students, we found no evidence for any of the claims. For sixteen students, we found evidence for one or two of the claims. Thus we have some instances of academic knowledge being reinforced through practical experience, but the evidence is far from overwhelming. As for the motivation effect, we found evidence in only seven of our cases. However, we must note that the community college students in general were already highly motivated and thus not affected by the experience in that way (with one exception).

Almost half (twelve out of twenty-five) of the students experienced instances of the simple application of school-based knowledge at work. The medical-site internships offered through the health programs were particularly promising in this regard; they did tend to involve scientific facts and knowledge. Regarding the testing and exploration of school-based knowledge, we found evidence for this in only three of the internships. These cases are instructive, as in each instance the internship matched the student's major field of study or was paired with an independent study. These cases could be viewed almost as training in the students' chosen occupational fields, in which the work-based learning corresponded closely to, and built upon, academic and theoretical knowledge.

Yet what was more often the case was that the interns' tasks were productive for the work of the office or site, such as in the case of Alison, who created a spreadsheet listing vendor information for the corporate strategic sourcing department of a bank (IEE Observation xa2), or José, who inspected hotel rooms for maintenance needs (IEE Observation xvi2). Two of our community college interns, Ali and Abdul, had useful, challenging internships in a highly technical field (in which they hoped to gain permanent employment). These are certainly jobs that require cognitive ability, but one could not characterize them as having academic content or requiring academic skills. In the transportation program Stasz studied, students reported that nearly 90 percent of their duties were either "general clerical/office work" or "computers/data entry" (Stasz & Kaganoff, 1997). Except for the students who were taking courses in clerical skills and data entry in school, the academic reinforcement functions were minimal. Thus in general the work of the internships was functional to the organization, as would be expected, but hardly academic.

Moreover, the curriculum structure problem needs careful examination. In most cases, students' exposure to situated knowledge could be characterized as episodic, as driven by the contingencies of the work process rather than by a rational conception of the sequence of learning. When Fred, the Vermont veterinary assistant, went beyond the relatively menial work of cleaning up after surgeries and maintaining the office files, when he encountered knowledge-use of a more scientific nature, the specific content was determined by the particular patients that were brought into the clinic. There were a lot of neutering operations, for instance, so he had a number of opportunities to observe and ask questions about reproductive organs; in these instances he participated in practice and

engaged in exploration. The tail amputation was rather unusual, a one-shot exposure to that aspect of anatomy, which meant he was able to explore a bit—though it was not clear that he understood the broader context of the information.

As we indicated earlier, this sort of episodic exposure to complex knowledge at work could be the basis for more extensive and systematic investigations. That is the strategy that Dewey (1938) advocated. But, contrary to the rhetoric of those who translate his message as simply "learning by doing," Dewey in fact insisted on the carefully designed intervention of the educator to exploit and extend the learning potential in natural experience. He did not believe that such experience was educationally sufficient in its own right. This is a pedagogical issue.

Alternative Possibilities

In the internships we studied, we did not find students frequently learning academic concepts or applying academic skills. One could argue that none of the programs we studied had a purposive design to that end. Should, and could educators and employers structure internships to try to bring about the academic reinforcement effect?

Stasz and Kaganoff (1997) conclude that, while the connections between school and work were weak in the programs they studied, the students learned many valuable lessons and developed many skills. They question whether the lack of connection to specific academic classes made the work experiences less valuable, and say that making these explicit connections may not necessarily be a desirable goal. In particular, worksite supervisors and mentors do not tend to act as teachers towards students, and it would be

difficult to design internships to follow or connect with a specific classroom-based curriculum.

More often what programs attempt is to connect workplace experiences to classroom subject matter through an occupational theme. Medical careers programs assign students to job rotations in hospitals or other health-care sites, and courses are taken in relevant science and health subjects. In economics and finance programs, students take accounting and business courses, and efforts are made to acquire internship slots in banks and other finance-related companies. In the travel and tourism program we studied, students have a special geography class, a travel and tourism class, and an English class that uses literature and assignments with a travel theme. During the summer between their junior and senior years, students are placed in internships in hotels, the regional airport, and various travel companies. A thorough analysis of the curricula for all of the courses for this academy found that there were few structured activities or assignments that made use of students' individual internships. Students did write short essays about their internships and their supervisors' work histories at the end of the summer, but once back in the classroom in the fall, the internship experiences were not integrated into the coursework. Thus the theme of travel and tourism encompassed the curricula and internships, but the two were not brought together in more specific ways.[iii]

One program, selected for our study because it was called an "Academic Internship Program," found the difficulty of clustering the diverse group of students in the program—diverse both academically and with regard to the occupational fields of their internships—in an academic course. The teacher tried to create a curriculum that would integrate the students' interests in different occupational fields with English, using

general work-related readings and journal-writing assignments. The students complained that the curriculum was too similar to that of their internship seminar (which involved many types of internship-reflection exercises), and the teachers agreed. As a result, the English class dissolved into individual study projects, in which the students read books related to their specific occupational field, created bibliographies of relevant works, and so on. In the end they wrote lengthy papers and presented them to panels of employers, parents, and school staff. Thus these students did complete academic assignments related to their chosen general occupational area.

There are ways to use and apply knowledge gained in the workplace to academic subject-matter. Rather than students using academic skills in a work context, which we found occurring infrequently, activities engaged in at the workplace can be used to bring about a better understanding of knowledge or concepts being taught in the classroom. The idea is that a student interning at a hospital who is able to observe surgeries would then understand human anatomy (at school, in biology class) more deeply and would better retain the knowledge. The student's authentic experience with biology would reinforce the classroom lesson in the subject. This possibility is distinct from the three described above in that there is no assumption that school-based knowledge is being used by the student at the internship.

This more promising way to reinforce academics through work-based learning was found in one program. Rather than assuming that academic learning will be possible at the workplace, real-world situations and examples are imported into the classroom. In this particular program, a medical careers initiative, the teachers created assignments that called upon students to use their hospital internship experiences to illustrate and better

understand academic concepts. For example, in their medical-related economics class, students were asked to use examples from their internships to illustrate the concepts "division of labor" and "productivity," and suggest ways their hospital departments could improve productivity. (The assignment, and an actual example of a student's work, is attached.) This is one small example of a strategy that teachers could take to try to bring about academic reinforcement.

CONCLUSION

We are not arguing here that work-based learning never reinforces academic learning. Our examples suggest, however, that such a claim is more tenuous than common wisdom and the prevailing rhetoric would have it. We do not believe that the evidence from our research and that of others provides strong support for this popular assertion about work-based learning. The school-work connection does happen in some situations, sometimes as a natural consequence of the work itself and sometimes as an intentional pedagogical intervention; the latter circumstance is probably the more likely one. But work-based learning proponents who stand on the reinforcement claim as a way to convince skeptics of the program's value are standing on thin ice. We argue that there are other, non-academic but equally important forms of learning that can come from work experience and that these forms give us good grounds for supporting work-based learning—*when it is done well*. That last phrase is crucial. Our experience with work-based learning teaches us that one cannot easily generalize about its impact. Poor placements can lead to dismal, miseducative experiences, but quality work-based learning can provide benefits above and beyond what students get even in excellent classrooms.

Table 1: Work-Based Learning Student Cases: Academic Reinforcement Findings

	school/program	internship	school-based knowledge applied at work	school-based knowledge explored and tested	motivation effect from work-based learning
Shin-Kap	community college co-op	office of local orchestra	no	no	no
Carrie	community college co-op	office of local orchestra	no	no	no
Etienne	community college co-op	trade division of consulate	no	no	no
Irina	community college co-op	trade division of consulate	no	no	no
Carola	community college co-op	transportation authority legal office	reading, text analysis	yes - paralegal studies	no
Carmen	community college co-op	ad agency accounting office*	math	yes – accounting coursework	no
Ali	community college co-op	Computer networking*	no	no	yes
Abdul	community college co-op	Computer networking*	no	no	no
Nell	HS health program	Radiology	no	no	yes
Fiona	HS health program	OR/ Anesthesiology	science, reading	no	no
Matthew	HS health program	post-surgical unit	science	no	yes
Rob	HS health program	Physical therapy gym	science	no	yes
Renee	HS E&F academy	University accounts payable office	no	no	yes
Maria	HS E&F academy	Consulting firm general counsel office*	no	no	yes

	school/program	Internship	school-based knowledge applied at work	school-based knowledge explored and tested	motivation effect from work-based learning
Alison	HS E&F academy	bank's purchasing dept.*	no	no	no
Hiroshi	HS E&F academy	Investment bank's warehouse*	math	no	yes
Catherine	HS E&F academy	Investment bank's mutual funds dept.*	math, accounting	no	no
Fred	HS academic internship program	animal hospital	science	no	no
Dan	HS academic internship program	Construction site	possibly math	no	no
Adam	HS academic internship program	Independent filmmaking	reading, writing, math	no	no
Maureen	HS academic internship program	middle school music class	reading	yes – theories of teaching	no
Isabella	HS T&T academy	travel corp. office of corp. services*	no	no	no
Paul	HS T&T academy	travel corp. hotel group*	no	no	no
Jose	HS T&T academy	Hotel housekeeping dept.*	no	no	no
Sinda	HS T&T academy	travel industry magazine*	geography, writing	no	no

* indicates paid internship

NOTES

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[i] The first part of the project examined the programs' success with regard to employer recruitment and retention, and employers' motivations for participating. Two telephone surveys were also conducted, one of employers participating in the programs and one of non-participating employers. See Bailey, Hughes, & Barr, 1998; and Hughes, 1998.

[ii] In some cases, the worksite was chosen first, based on the willingness of the employer to host researchers. Then it was hoped that the student assigned to that workplace would agree to participate in the study. In only one case did that not happen.

[iii] And indeed, an earlier evaluation report on the Academy of Travel and Tourism recommended that "more attention be given to infusing academic instruction into the internship experience" (Academy for Educational Development, 1995). The report also stated that more care needed to be taken to ensure quality internship placements, and internship supervisors should receive a formal orientation and structured support.

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PRODUCTIVITY

Productivity is the amount of output (goods and services) produced per unit of input (the factors of production, or economic resources, that are used). An increase in productivity is generally the result of two different conditions: 1) more goods and services are produced without increasing the amount of resources, or 2) the same amount of goods and services is produced using a smaller amount of resources. Increases in productivity help reduce the economic problem of scarcity, but cannot eliminate it.

Because productivity is often related to labor, it also may be defined as output per worker per hour. Labor productivity increases with advances in technology, investment in capital goods, and investment in human capital.

Question: Answer the following question in 300-400 words. Y ou may discuss the questions with people in your department or class. However, you must write your own answer and provide specific examples from your experience or from discussions with others.

Using your experiences working in a large hospital setting, discuss in what ways a hospital demonstrates specialization and division of labor to increase productivity. Then discuss ways that the hospital increases its investment in capital and in human capital to increase productivity. Provide some examples from your knowledge of the hospital. Finally, discuss ways that specialization and/or division of labor may not always prove effective for increasing productivity. Specific examples are required.

Prepared to discuss _____

Report due _____

Economics
Productivity

STUDENT'S NAME DELETED

Productivity is the amount of output produced per unit of input. Thus, the goal of productivity is to get more goods produced with the same about of resources or to get the same about of products with less resources used. Via Health is a huge example. By combining their resources, less was wasted and thus productivity was increased. At my department, 5800, everything is being done in order to increase productivity.

At the basic level, there are very simple things done to save resources. For example, by having two patients in one room, they take up less space, only require general medical equipment for one patient (such as sharps boxes), and can share the bathroom. One could only imagine how much more it would cost if each patient had their own bathroom etc. Also, there is a lot of work that needs to be done. In fact there is so much that there is a shortage of workers. As we all know, nurses are the most abundant work force in the hospital because of the wide variety of jobs they do. However, a lot of it is menial. So, because there is so much menial work, the hospital hires technicians, who are much cheaper than RN's to do those jobs. Thus, the work load is handled but, at a much more cost effective way.

There are also detailed ways to save money. Now they are putting blood samples in bags to increase safety and to cut down on the use of gloves. They also are training technicians to do blood and secretarial work. Although, the technicians will cost more if they can do blood etc., they will still cost much less

than nurses. In addition, the responsibilities of technicians are expanding. They are required to do more patient transport when possible. Thus, less money has to be spent on patient transport for technicians do not have to be paid more to do this job.

Technology has also increased productivity. Every thing done in my unit is effected by technology. Temperatures can be taken faster, patients can be monitored without having to check on them all the time, and computers hasten just about anything they need to.

As seen throughout this essay one can see a lot of division of labor. In many cases, this can be a bad thing if not done properly. For example, if a person become too specialized then they cost the hospital a lot of money to cover a very few types of cases. Thus,. very little times will a person see division of labor occur where more requirements are not added on to each division. A good example of how this works is the creation of a unit technician.

Thus, one can see how 5800 is trying to reduce the costs on their floor. Unfortunately, even though so much is being done to increase productivity, Via health is 30,000 million dollars in debt and is now closing a hospital. However, it is pretty amazing to see how things are done in a hospital and hopefully the plethora of problems presented through economics will be reduced to a tolerable level.

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